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Dynamics and distribution of doped holes in the CuO2 plane of slightly doped antiferromagnetic YBa2(Cu1-zLiz)3O6+x (x < 0.1) studied by Cu(1) NQR

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Abstract

Incidence of doped holes in the CuO2 plane on the AF state was studied by Cu(1) nuclear quadrupole resonance (NQR) in slightly doped YBa2(Cu1-zLiz)3O6+x compounds. Inhomogeneous distribution of doped holes in the plane was detected in the low temperature measurements of transverse (1/T2) and longitudinal (1/T1) relaxation rates. We establish that at lower T the holes motion slows down and we estimate that the holes localize finally in restricted regions (~3 lattice constants) in the Coulomb potential of the Li+ ions. Also we compared the hole behavior in slightly doped YBa2(Cu1-zLiz)3O6+x samples with that in slightly doped Y1-yCayBa2Cu3O6. A stronger trapping potential of the in-plane Li+ impurities was concluded as compared to slightly doped Y1-yCayBa2Cu3O6 compound with out-of-plane Ca2+ impurities. © Pleiades Publishing, Inc., 2010.

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